

Advanced Measurements Optical Range

A Vital Capability for the U.S. National Defense

U.S. Army Space and Missile Defense Command
Space and Missile Defense Technical Center

The increasingly sophisticated missile threats emerging in the 21st century will require development of advanced sensing and measurement capabilities. The U.S. Army Space and Missile Defense Command operates the Advanced Measurements Optical Range (AMOR) as a ground based testbed specifically designed to develop and test advanced sensing and measurement concepts for countering current and emerging threats. The availability and use of AMOR represents a vital capability for the U.S. national defense.

Unique Features

AMOR is an indoor lidar measurements facility possessing several unique features with specific utility in the area of national defense.

- **Optical Aperture** — The AMOR large optical telescope system features a two-meter diameter primary mirror. This gives AMOR the capability to make realistic lidar measurements of full scale RVs and decoys as well as tactical targets and munitions.

- **Target Motion** — The AMOR target mount provides realistic target motion of full-scale strategic type targets. The mount can hold targets weighing up to 275 kg at aspect angles continuously variable from 0 to 90 degrees. The target mount also provides spin at rates up to 3 Hz and precession at up to 15°/sec. Target wobble can also be produced.

- **Far-field** — The AMOR optical system provides the capability to take the output of a transmitter and produce a high quality collimated beam of about two meters in diameter, which provides an illumination of the target with the characteristics needed for far-field measurements. The optical system also provides the necessary optics to collect scattered radiation from the target with a very narrow angular field-of-view to complete the far-field simulation. Variable range capabilities also include an optical zoom system for fly-in-simulations using active or passive sensors.

- **Lidar Transceivers** — Transceivers at AMOR are operational at 10.6 μm , 1.06 μm , and 0.53 μm . Coherent (heterodyne detection) measurements of targets are available at 10.6 μm and 1.06 μm . Incoherent (direct detection) measurements are made at 0.53 μm . Wide-bandwidth waveforms allow detailed target signature measurements.

- **Passive Sensors** — A range of passive sensors (Si, InSb, and HgCdTe) enables measurements in the visible, 3-5 μm , and 8-12 μm wavebands. By combining this capability with the AMOR lidar transceivers, simultaneous lidar/passive measurements are performed.

- **Calibrated** — All lidar measurements are calibrated using specularly reflecting spheres of known cross-section.

Mission Areas

AMOR is a multifunctional facility capable of supporting several vital defense mission areas.

- **Target Measurements** — AMOR provides the capability for lidar measurements on a wide variety of reentry vehicles, decoys, tactical and analytical targets. A proven track record of target measurements ensures fully characterized measurements of new targets.

- **Sensor Testbed** — AMOR is an excellent lidar sensor testbed from visible to Long-Wave Infrared wavelengths. Flexibility in the AMOR facility design allows integration and testing of a wide variety of lidar sensors.

- **Algorithm Development and Testing** — Range-Doppler images, range resolved target cross-sections, and total cross-sections taken on realistic targets undergoing actual spin and precession motion provide essential data input for discrimination algorithm development and testing.

- **Advanced Lidar/Passive Sensor Concept Development** — Advanced sensors with both lidar and passive capabilities will be required to counter both current and emerging missile threats. AMOR is a unique testbed for developing lidar/passive sensor concepts.

For more information, please contact:

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